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**United States Patent** [19]

Rao et al.

[11] Patent Number: **5,990,389**[45] Date of Patent: **\*Nov. 23, 1999**[54] **HIGH LYSINE DERIVATIVES OF  $\alpha$ -HORDOTHIONIN**[75] Inventors: **A. Gururaj Rao, Urbandale; Larry Beach, Des Moines, both of Iowa**[73] Assignee: **Pioneer Hi-Bred International, Inc., Des Moines, Iowa**

[\*] Notice: This patent is subject to a terminal disclaimer.

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[63] Continuation of application No. 08/575,654, Dec. 20, 1995, abandoned, which is a continuation of application No. 08/369,975, Jan. 6, 1995, abandoned, which is a continuation of application No. 08/003,885, Jan. 13, 1993, abandoned.

[51] Int. Cl.<sup>6</sup> ..... **A01H 5/00; C12N 15/29; C12N 15/82; A01G 13/00**[52] U.S. Cl. .... **800/301; 800/279; 530/300; 530/372; 536/23.6; 435/410; 435/419; 435/468; 435/320.1**[58] Field of Search ..... **800/205, 200, 800/250, DIG. 9, DIG. 52, 301, 298, 278, 279, 295; 435/69.1, 70.1, 172.3, 410, 411, 412, 414, 415, 416, 419, 252.3; 47/58; 536/23.6; 530/300, 372; 514/2**[56] **References Cited****U.S. PATENT DOCUMENTS**

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[57] **ABSTRACT**Derivatives of  $\alpha$ -hordothionin made by position-specific substitution with lysine residues provide lysine enrichment while retaining the antifungal activity of the parent compound.**21 Claims, 2 Drawing Sheets**

FOOTNOTES